

SEQUENCE LISTING

<110> Wang, Caili
Zhong, Pingyu
Wang, Xinwei

<120> ADAPTER-DIRECTED DISPLAY SYSTEMS

<130> 13403.0005NPUS00

<160> 24

<170> PatentIn version 3.1

<210> 1

<211> 57

<212> DNA

<213> Bacteriophage M13

<400> 1

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57

<210> 2

<211> 19

<212> PRT

<213> Bacteriophage M13

<400> 2

Val	Lys	Lys	Leu	Leu	Phe	Ala	Ile	Pro	Leu	Val	Val	Pro	Phe	Tyr	Ser
1				5					10					15	

His Ser Ala

<210> 3

<211> 57

<212> DNA

<213> Bacteriophage M13

<400> 3

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57

<210> 4
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 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic, comprising phage gene III leader sequence, GABAB
 recep
 tor 2 domain and Myc domain

<400> 4
 ttagtggtac ctttctattc tcaactccgct acatcccgc tggagggcct acagtcagaa
 60

 aaccatcgcc tgcgaatgaa gatcacagag ctggataaag acttggaaga ggtcaccatg
 120

 cagctgcagg acgtcggagg ttgctgggcc gcagaacaaa aactcatctc agaagaggat
 180

 ctgagatctg gaggcggtac tggtgaaagt tgtttagcaa aa
 222

<210> 5
 <211> 74
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> Synthetic, comprising phage gene III leader sequence, GABAB
 recep
 tor 2 domain and Myc domain

<400> 5

 Leu Val Val Pro Phe Tyr Ser His Ser Ala Thr Ser Arg Leu Glu Gly
 1 5 10 15

 Leu Gln Ser Glu Asn His Arg Leu Arg Met Lys Ile Thr Glu Leu Asp
 20 25 30

 Lys Asp Leu Glu Glu Val Thr Met Gln Leu Gln Asp Val Gly Gly Cys
 35 40 45

Ala Ala Ala Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu Arg Ser Gly
 50 55 60

Gly Gly Thr Val Glu Ser Cys Leu Ala Lys
 65 70

<210> 6
 <211> 56
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic, comprising phage gene III leader sequence, GABAB
 recep
 tor 2 domain and Myc domain

<400> 6

Thr Ser Arg Leu Glu Gly Leu Gln Ser Glu Asn His Arg Leu Arg Met
 1 5 10 15

Lys Ile Thr Glu Leu Asp Lys Asp Leu Glu Glu Val Thr Met Gln Leu
 20 25 30

Gln Asp Val Gly Gly Cys Ala Ala Ala Glu Gln Lys Leu Ile Ser Glu
 35 40 45

Glu Asp Leu Arg Ser Gly Gly Gly
 50 55

<210> 7
 <211> 3093
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic, comprising ampicillin gene sequence, ColE1 repli
 cation
 origin, f1 replication origin, Plac promoter, GABAB recept
 or 1 d
 omain, histidine tag

<400> 7

gcgcaacgca attaatgtga gttagctcac tcattaggca cccagggctt tacactttat
60

gcttccggct cgtatgttgt gtggaattgt gagcggataa caatttaccg gttctttaag
120

gaggaattaa aaaatgaaat acctattgcc tacggcagcc gctggattgt tattactcgc
180

ggcccagccg gccatggcgg ccctgcaggc ctctagagcg gccgctggag gtgaggagaa
240

gtcccggctg ttggagaagg agaaccgtga actggaaaag atcattgctg agaaagagga
300

gcgtgtctct gaactgcgcc atcaactcca gtctgtagga ggttgtagat cttatccata
360

cgacgtacca gactacgcag gaggtcatca ccatcatcac cattaatgag tcgacctcga
420

ccaattcgcc ctatagttag tcgtattaca attcactggc cgtcgtttta caacgctcgt
480

actgggaaaa ccctggcggt acccaactta atcgcccttc agcacatccc cctttcgcca
540

gctggcgtaa tagcgaagag gcccgccaccg atcgcccttc ccaacagttg cgcagcctga
600

atggcgaatg ggacgcgccc tgtagcggcg cattaagcgc ggcggggtgtg gtggttacgc
660

gcagcgtgac cgctacactt gccagcgccc tagcgcccgc tcctttcgtt ttcttcctt
720

cctttctcgc cacgttcgcc ggctttcccc gtcaagctct aaatcggggg ctccctttag
780

ggttccgatt tagtgcttta cggcacctcg accccaaaaa acttgattag ggtgatggtt
840

cacgtagtgg gccatcgccc tgatagacgg tttttcgccc ttgacgttg gagtccacgt
900

tctttaatag tggactcttg ttccaaactg gaacaacact caaccctatc tcggtctatt

960

cttttgatatt ataagggatt ttgccgattt cggcctattg gttaaaaaat gagctgattt
1020

aacaaaaatt taacgcgaat ttttaacaaaa tattaacgct tacaatttag gtggcacttt
1080

tcggggaaat gtgcgcggaa cccctatttg tttatttttc taaatacatt caaatatgta
1140

tccgctcatg agacaataac cctgataaat gcttcaataa tattgaaaaa ggaagagtat
1200

gagtattcaa catttccgtg tcgcccttat tccctttttt gcggcatttt gccttcctgt
1260

ttttgctcac ccagaaacgc tggtgaaagt aaaagatgct gaagatcagt tgggtgcacg
1320

agtgggttac atcgaactgg atctcaacag cggtaagatc cttgagagtt ttcgccccga
1380

agaacgtttt ccaatgatga gcacttttaa agttctgcta tgtggcgcgg tattatcccg
1440

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1500

tgagtactca ccagtcacag aaaagcatct tacggatggc atgacagtaa gagaattatg
1560

cagtgtgcc ataaccatga gtgataacac tgcggccaac ttacttctga caacgatcgg
1620

aggaccgaag gagctaaccg cttttttgca caacatgggg gatcatgtaa ctgccttga
1680

tcgttgggaa ccggagctga atgaagccat accaaacgac gagcgtgaca ccacgatgcc
1740

tgtagcaatg gcaacaacgt tgcgcaaact attaaactggc gaactactta ctctagcttc
1800

ccggcaacaa ttaatagact ggatggaggc ggataaagtt gcaggaccac ttctgcgctc
1860

ggcccttccg gctggctggg ttattgctga taaatctgga gccggtgagc gtgggtctcg

1920

cggtatcatt gcagcactgg ggccagatgg taagccctcc cgtatcgtag ttatctacac
1980

gacggggagt caggcaacta tggatgaacg aaatagacag atcgctgaga taggtgcctc
2040

actgattaag cattggtaac tgtcagacca agtttactca tatatacttt agattgattt
2100

aaaacttcat ttttaattta aaaggatcta ggtgaagatc ctttttgata atctcatgac
2160

caaaatccct taacgtgagt tttcgttcca ctgagcgtca gaccccgtag aaaagatcaa
2220

aggatcttct tgagatcctt tttttctgcg cgtaatctgc tgcttgcaaa caaaaaaacc
2280

accgctacca gcggtggttt gtttgccgga tcaagagcta ccaactcttt ttccgaaggt
2340

aactggcttc agcagagcgc agataccaaa tactgtcctt ctagtgtagc cgtagttagg
2400

ccaccacttc aagaactctg tagcaccgcc tacatacctc gctctgctaa tcctgttacc
2460

agtggctgct gccagtggcg ataagtcgtg tcttaccggg ttggactcaa gacgatagtt
2520

accggataag gcgcagcggg cgggctgaac ggggggttcg tgcacacagc ccagcttgga
2580

gcgaacgacc tacaccgaac tgagatacct acagcgtgag ctatgagaaa gcgccacgct
2640

tcccgaaggg agaaaggcgg acaggtatcc ggtaagcggc agggtcggaa caggagagcg
2700

cacgagggag cttccagggg gaaacgcctg gtatctttat agtctgtcg ggtttcgcca
2760

cctctgactt gagcgtcgat ttttgtgatg ctcgtcaggg gggcggagcc tatggaaaaa
2820

cgccagcaac gcggcctttt tacggttcct ggcccttttg tggccttttg ctcacatggt

2880

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2940

taccgctcgc cgcagccgaa cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga
3000

gcgcccataa cgcaaaccgc ctctccccgc gcgttggccg attcattaat gcagctggca
3060

cgacaggttt cccgactgga aagcgggcag tga
3093

<210> 8

<211> 192

<212> DNA

<213> Bacteriophage M13

<400> 8

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aaactcatct cagaagagga tctgagatct agatctggag gcggtactgt tgaaagttgt
120

ttagcaaaac ctcatacaga aaattcattt actaacgtct ggaaagacga caaaacttta
180

gatcggttacg ct
192

<210> 9

<211> 64

<212> PRT

<213> Bacteriophage M13

<220>

<221> MISC_FEATURE

<222> (11)..(11)

<223> Xaa = stop codon

<400> 9

Leu Val Val Pro Phe Tyr Ser His Ser Ala Xaa Ala Cys Gly Gly Ala

15

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480

gacgcgccct gtagcggcgc attaagcgcg gcgggtgtgg tggttacgcg cagcgtgacc
540

gctacacttg ccagcgccct agcgcccgct cctttcgctt tcttcccttc ctttctcgcc
600

acgttcgccg gctttccccc tcaagctcta aatcgggggc tccctttagg gttccgattt
660

agtgttttac ggcacctcga ccccaaaaaa cttgattagg gtgatggttc acgtagtggg
720

ccatcgccct gatagacggt ttttcgccct ttgacgttgg agtccacggt ctttaatagt
780

ggactcttgt tccaaactgg aacaacactc aaccctatct cggtctattc ttttgattta
840

taagggattt tgccgatttc ggcctattgg ttaaaaaatg agctgattta acaaaaattt
900

aacgcgaatt ttaacaaaat attaacgctt acaatttagg tggcactttt cggggaaatg
960

tgcgcggaac ccctatttgt ttatTTTTTct aaatacattc aaatatgtat ccgctcatga
1020

gacaataacc ctgataaatg cttcaataat attgaaaaag gaagagtatg agtattcaac
1080

atttccgtgt cgcccttatt ccctTTTTTtg cggcattttg ccttcctggt tttgctcacc
1140

cagaaacgct ggtgaaagta aaagatgctg aagatcagtt ggggtgcacga gtgggttaca
1200

tcgaactgga tctcaacagc ggtaagatcc ttgagagttt tcgccccgaa gaacgttttc
1260

caatgatgag cactttttaa gttctgctat gtggcgcggt attatcccggt attgacgccg
1320

ggcaagagca actcggtcgc cgcatacact attctcagaa tgacttggtt gagtactcac
1380

cagtcacaga aaagcatctt acggatggca tgacagtaag agaattatgc agtgctgcca
1440

taaccatgag tgataaact gcggccaaact tacttctgac aacgatcgga ggaccgaagg
1500

agctaaccgc ttttttgcac aacatggggg atcatgtaac tcgccttgat cgttgggaac
1560

cggagctgaa tgaagccata ccaaacgacg agcgtgacac cacgatgcct gtagcaatgg
1620

caacaacgtt gcgcaaacta ttaactggcg aactacttac tctagcttcc cggcaacaat
1680

taatagactg gatggaggcg gataaagttg caggaccact tctgcgctcg gcccttcagg
1740

ctggctggtt tattgctgat aaatctggag ccggtgagcg tgggtctcgc ggtatcattg
1800

cagcactggg gccagatggg aagccctccc gtatcgtagt tatctacacg acggggagtc
1860

aggcaactat ggatgaacga aatagacaga tcgctgagat aggtgcctca ctgattaagc
1920

attggttaact gtcagaccaa gtttactcat atatacttta gattgattta aaacttcatt
1980

tttaatttaa aaggatctag gtgaagatcc tttttgataa tctcatgacc aaaatccctt
2040

aacgtgagtt ttcgttccac tgagcgtcag accccgtaga aaagatcaaa ggatcttctt
2100

gagatccttt ttttctgcgc gtaatctgct gcttgcaaac aaaaaaacca ccgctaccag
2160

cggtggtttg tttgccggat caagagctac caactctttt tccgaaggta actggcttca
2220

gcagagcgca gataccaaat actgtccttc tagtgtagcc gtagttaggc caccacttca
2280

agaactctgt agcaccgcct acatacctcg ctctgctaata cctgttacca gtggctgctg
2340

ccagtggcga taagtctgtg cttaccgggt tggactcaag acgatagtta ccggataagg
2400

cgcagcggtc gggctgaacg gggggttcgt gcacacagcc cagcttggag cgaacgacct
2460

acaccgaact gagataccta cagcgtgagc tatgagaaag cgccacgctt cccgaaggga
2520

gaaaggcgga caggtatccg gtaagcggca gggtcggaac aggagagcgc acgagggagc
2580

ttccaggggg aaacgcctgg tatctttata gtctgtcgg gtttcgccac ctctgacttg
2640

agcgtcgatt tttgtgatgc tcgtcagggg ggcggagcct atggaaaaac gccagcaacg
2700

cggccttttt acggttcctg gccttttgct ggccttttgc tcacatgttc tttcctgcgt
2760

tatcccctga ttctgtggat aaccgtatta ccgcctttga gtgagctgat accgctcgcc
2820

gcagccgaac gaccgagcgc agcgagtcag tgagcgagga agcggaagag cgcccaatac
2880

gcaaaccgcc tctccccgcg cgttggccga ttcattaatg cagctggcac gacaggtttc
2940

ccgactggaa agcgggcagt ga
2962

<210> 11
<211> 903
<212> DNA
<213> Bacteriophage M13

<400> 11
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aaccatcgcc tgcgaatgaa gatcacagag ctggataaag acttggaaga ggtcaccatg
120

cagctgcagg acgtcggagg ttgcgcggcc gcagaacaaa aactgatctc agaagaggat

180

ctgacgcgtg ctggcggcgg ctctggtggt ggttctggtg gcggctctga gggcggcggc
240

tctgaggggtg gcggttctga gggcggcggc tctgaggggtg gcggttccgg tggcggctcc
300

ggttccgggtg attttgatta tgaaaaaatg gcaaacgcta ataagggggc tatgaccgaa
360

aatgccgatg aaaacgcgct acagtctgac gctaaaggca aacttgattc tgtcgctact
420

gattacgggtg ctgctatcga tggtttcatt ggtgacgttt ccggccttgc taatggtaat
480

ggtgctactg gtgattttgc tggctctaata tcccaaattg ctcaagtcgg tgacgggtgat
540

aattcacctt taatgaataa tttccgtcaa tatttacctt ccctccctca atcggttgaa
600

tgtcgccctt ttgtctttgg cgctggtaaa ccatatgaat tttctattga ttgtgacaaa
660

ataaacttat tccgtggtgt ctttgcggtt cttttatatg ttgccacctt tatgtatgta
720

ttttctacgt ttgctaacaat actgcgtaat aaggagtctt aataaggcgc gccacaattt
780

cacagtaagg aggtttaata aatgaaaaag acagctattg cgattgcagt ggcactggct
840

ggtttcgcta ccgtagcgca ggctagatct ggaggcggta ctggtgaaag ttgttttagca
900

aaa
903

<210> 12
<211> 287
<212> PRT
<213> Bacteriophage M13

<400> 12

Leu Val Val Pro Phe Tyr Ser His Ser Ala Thr Ser Arg Leu Glu Gly
1 5 10 15

Leu Gln Ser Glu Asn His Arg Leu Arg Met Lys Ile Thr Glu Leu Asp
20 25 30

Lys Asp Leu Glu Glu Val Thr Met Gln Leu Gln Asp Val Gly Gly Cys
35 40 45

Ala Ala Ala Glu Gln Lys Leu Ile Ser Glu Glu Asp Leu Thr Arg Ala
50 55 60

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Ser Glu Gly Gly Gly
65 70 75 80

Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser Glu Gly Gly Gly Ser
85 90 95

Gly Gly Gly Ser Gly Ser Gly Asp Phe Asp Tyr Glu Lys Met Ala Asn
100 105 110

Ala Asn Lys Gly Ala Met Thr Glu Asn Ala Asp Glu Asn Ala Leu Gln
115 120 125

Ser Asp Ala Lys Gly Lys Leu Asp Ser Val Ala Thr Asp Tyr Gly Ala
130 135 140

Ala Ile Asp Gly Phe Ile Gly Asp Val Ser Gly Leu Ala Asn Gly Asn
145 150 155 160

Gly Ala Thr Gly Asp Phe Ala Gly Ser Asn Ser Gln Met Ala Gln Val
165 170 175

Gly Asp Gly Asp Asn Ser Pro Leu Met Asn Asn Phe Arg Gln Tyr Leu
180 185 190

Pro Ser Leu Pro Gln Ser Val Glu Cys Arg Pro Phe Val Phe Gly Ala
 195 200 205

Gly Lys Pro Tyr Glu Phe Ser Ile Asp Cys Asp Lys Ile Asn Leu Phe
 210 215 220

Arg Gly Val Phe Ala Phe Leu Leu Tyr Val Ala Thr Phe Met Tyr Val
 225 230 235 240

Phe Ser Thr Phe Ala Asn Ile Leu Arg Asn Lys Glu Ser Met Lys Lys
 245 250 255

Thr Ala Ile Ala Ile Ala Val Ala Leu Ala Gly Phe Ala Thr Val Ala
 260 265 270

Gln Ala Arg Ser Gly Gly Gly Thr Val Glu Ser Cys Leu Ala Lys
 275 280 285

<210> 13

<211> 272

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic, comprising lac promoter, phage gene VIII leader
 sequence, influenza virus hemagglutinin tag, phage gene III sequence

<400> 13

aattgtgagc ggataacaat ttaccggttc ttttaacttt agtaaggagg aattaaataa
 60

tgaaaaagtc tttagtcctc aaagcctccg tagccgttgc taccctcggtt ccgatgctaa
 120

gcttcgcttc tagagcggcc gcttatccat acgacgtacc agactacgca ggaggtcatc
 180

accatcatca ccattagaga tctggaggcg gtactgttga aagttgttta gcaaaagcta
 240

acataactgcg taataaggag tcttaagtcg ac
272

<210> 14
<211> 69
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic, comprising influenza virus hemagglutinin tag, Hi
stidin
e tag, phage gene III sequence

<220>
<221> MISC_FEATURE
<222> (46)..(69)
<223> Xaa = stop codon

<400> 14

Met Lys Lys Ser Leu Val Leu Lys Ala Ser Val Ala Val Ala Thr Leu
1 5 10 15

Val Pro Met Leu Ser Phe Ala Ser Arg Ala Ala Ala Tyr Pro Tyr Asp
20 25 30

Val Pro Asp Tyr Ala Gly Gly His His His His His His Xaa Arg Ser
35 40 45

Gly Gly Gly Thr Val Glu Ser Cys Leu Ala Lys Ala Asn Ile Leu Arg
50 55 60

Asn Lys Glu Ser Xaa
65

<210> 15
<211> 146
<212> DNA
<213> Homo Sapien

<400> 15
tctagagggtg gaggaggtga ggagaagtcc cggctggttg agaaggagaa ccgtgaactg
60

gaaaagatca ttgctgagaa agaggagcgt gtctctgaac tgcgccatca actccagtct
120

gtaggaggtt gttaataggg cgcgcc
146

<210> 16
<211> 44
<212> PRT
<213> Homo Sapien

<400> 16
Ser Arg Gly Gly Gly Gly Glu Glu Lys Ser Arg Leu Leu Glu Lys Glu
1 5 10 15

Asn Arg Glu Leu Glu Lys Ile Ile Ala Glu Lys Glu Glu Arg Val Ser
20 25 30

Glu Leu Arg His Gln Leu Gln Ser Val Gly Gly Cys
35 40

<210> 17
<211> 140
<212> DNA
<213> Homo Sapien

<400> 17
tctcgaggag gtggtggaac atcccgctg gagggcctac agtcagaaaa ccatcgctg
60

cgaatgaaga tcacagagct ggataaagac ttggaagagg tcaccatgca gctgcaggac
120

gtcggaggtt gcgcggccgc
140

<210> 18
<211> 47

<212> PRT

<213> Homo Sapien

<400> 18

Ser Arg Gly Gly Gly Gly Thr Ser Arg Leu Glu Gly Leu Gln Ser Glu
1 5 10 15

Asn His Arg Leu Arg Met Lys Ile Thr Glu Leu Asp Lys Asp Leu Glu
20 25 30

Glu Val Thr Met Gln Leu Gln Asp Val Gly Gly Cys Ala Ala Ala
35 40 45

<210> 19

<211> 32

<212> DNA

<213> Bacteriophage M13

<400> 19

tttagtggtta cctttctatt ctcaactccgc tg
32

<210> 20

<211> 32

<212> DNA

<213> Bacteriophage M13

<400> 20

tagaaaggta ccactaaagg aattgcgaat aa
32

<210> 21

<211> 55

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic Primer

<400> 21

ggaattgtga gcggataaca atttaccggt cacacaggaa acagctatga ccatg
55

<210> 22
 <211> 55
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic Primer

<400> 22
 catggtcata gctgtttcct gtgtgaccgg taaattgtta tccgctcaca attcc
 55

<210> 23
 <211> 3057
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Synthetic, comprising Ampicillin gene sequence, ColE1 repli
 cation
 origin, f1 replication origin, lac promoter, GABAB recepto
 r 1 do
 main, influenza virus hemagglutinin tag

<400> 23
 gcgcaacgca attaatgtga gttagctcac tcattaggca cccaggctt tacactttat
 60

gcttccggct cgtatgttgt gtggaattgt gagcggataa caatttaccg gttctttaag
 120

gaggaattaa aaaatgaaaa agtcctttagt cctcaaagcc tccgtagccg ttgctaccct
 180

cgttccgatg ctaagcttcg ctggtgagga aaagtcccgt ctgctggaga aagagaaccg
 240

tgaactggaa aagatcattg ctgagaaaga ggagcgtgtt tctgaactgc gccatcaact
 300

gcagtctgta ggcggttgca cgcgttctag agcggccgct taccggtacg acgttccgga
 360

ctacgcatga taagtcgacc tcgaccaatt cgccctatag tgagtcgtat tacaattcac
 420

tggccgctcgt tttaacaacgt cgtgactggg aaaaccctgg cgttacccaa cttaatcgcc
480

ttgcagcaca tccccctttc gccagctggc gtaatagcga agaggcccgcc accgatcgcc
540

cttcccaaca gttgcgcagc ctgaatggcg aatgggacgc gccctgtagc ggcgcatata
600

gcgcggcggg tgtggtggtt acgcgcagcg tgaccgctac acttgccagc gccctagcgc
660

ccgctccttt cgctttcttc ccttcctttc tcgccacgtt cgccggcttt ccccgtaag
720

ctctaaatcg ggggctccct ttaggggtcc gatttagtgc tttacggcac ctcgacccca
780

aaaaacttga ttaggggtgat ggttcacgta gtggggccatc gccctgatag acgggttttc
840

gccctttgac gttggagtcc acgttcttta atagtggact cttgttccaa actggaacaa
900

cactcaaccc tatctcggtc tattcttttg atttataagg gattttgccg atttcggcct
960

attgggttaa aaatgagctg atttaacaaa aatttaacgc gaattttaac aaaatattaa
1020

cgcttacaat ttaggtggca cttttcgggg aaatgtgcgc ggaacccta tttgtttatt
1080

tttctaaata cattcaaata tgtatccgct catgagacaa taaccctgat aaatgcttca
1140

ataatattga aaaaggaaga gtatgagtat tcaacatttc cgtgtcgccc ttattccctt
1200

ttttgcggca ttttgccttc ctgtttttgc tcacccagaa acgctgggtga aagtaaaaga
1260

tgctgaagat cagttgggtg cacgagtggg ttacatcgaa ctggatctca acagcggtaa
1320

gaccttgag agttttcgcc ccgaagaacg ttttccaatg atgagcactt ttaaagttct
1380

gctatgtggc gcggtattat cccgtattga cgccgggcaa gagcaactcg gtcgccgcat
1440

acactattct cagaatgact tggttgagta ctcaccagtc acagaaaagc atcttacgga
1500

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origin

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ain, L

pp-OmpA gene sequence

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